3.15 TRANSPORTATION and PARKING

This section identifies the existing transportation network and conditions in the vicinity of the project site. SW Roxbury Street, the northern border of the site, serves as the boundary between the City of Seattle and King County. While the jurisdictional boundary is approximately center line of Roxbury, in the project vicinity, the City maintains the traffic signals on Roxbury. Thus, the study area for this analysis (shown in **Figure 3.15-1**) was selected in compliance with King County standards and in consultation with City of Seattle Design, Construction, and Land Use (DCLU) staff. King County standards require the analysis of all signalized intersections impacted by 30 or more new peak hour trips *and* 20-percent of the total peak hour project traffic. In addition to those King County signalized intersections meeting this threshold, additional intersections, both signalized and unsignalized, within the City of Seattle were identified for analysis after coordination with DCLU staff. Key unsignalized intersections internal to the existing site were also identified for analysis. A total of 5 signalized intersections and 4 unsignalized intersections were identified for study. Based on the anticipated circulation of site-generated traffic, all study intersections were evaluated during both the AM peak and PM peak hours.

Study intersections, shown later in Figure 3.15-1, include:

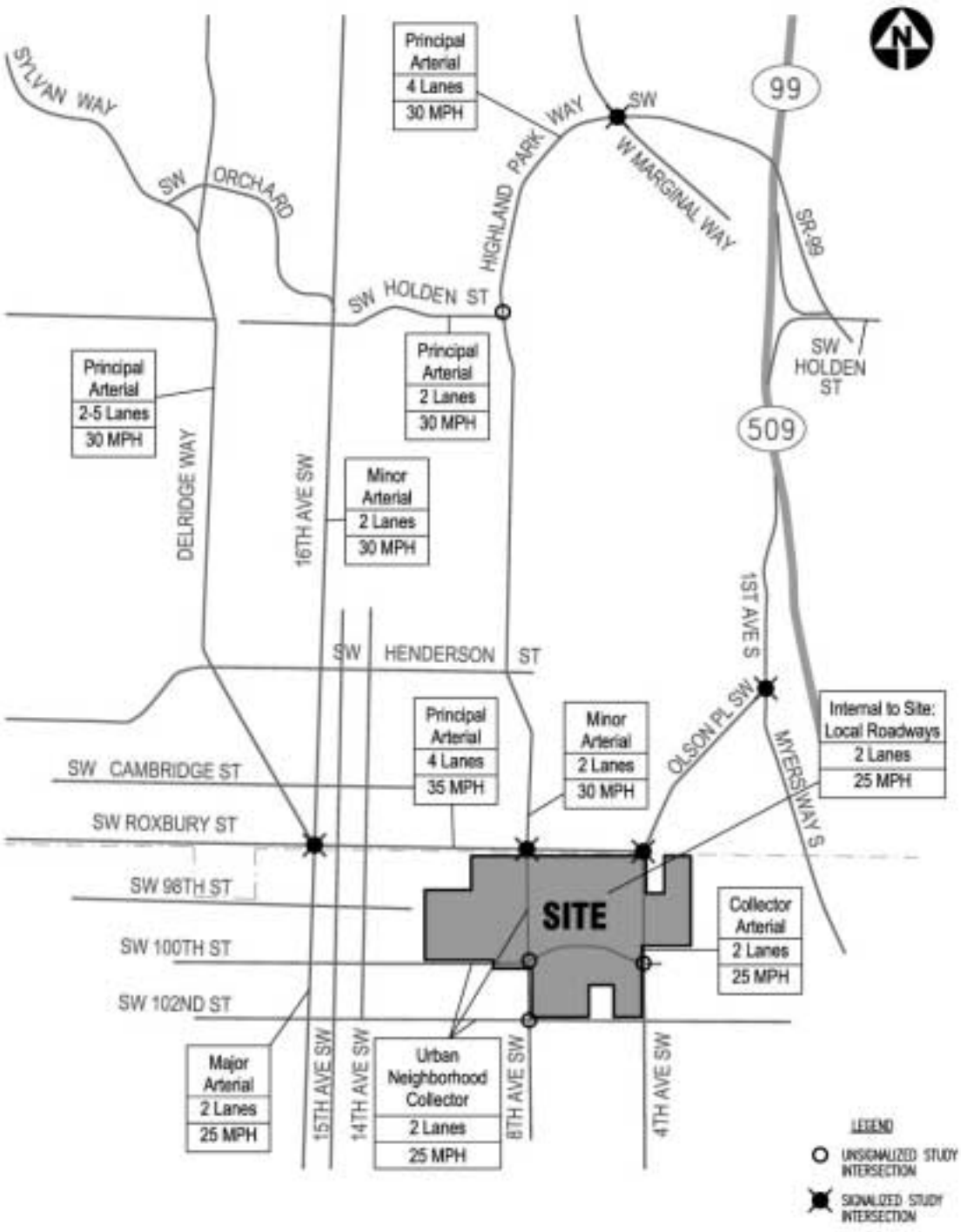
- 16th Avenue SW/SW Roxbury Street (signalized);
- 8th Avenue SW/SW Roxbury Street (signalized);
- Olson Place SW/SW Roxbury Street (signalized);
- 8th Avenue SW/ SW 100th Street (unsignalized);
- 4th Avenue SW/SW 100th Street (unsignalized);
- 8th Avenue SW/SW 102nd Street (unsignalized);
- Olson Place SW/1st Avenue S (signalized);
- Highland Park Way SW/SW Holden Street (unsignalized); and
- W Marginal Way SW/Highland Park Way SW (signalized).

3.15.1 Affected Environment

The following sub-sections describe the existing street system, traffic volumes, traffic operations, transit service and facilities, non-motorized facilities, traffic safety, and parking conditions within the project's vicinity and on the project site.

Street System

The current roadway system within the project site provides a combination of standard grid and circuitous circulation throughout the site connecting to larger roadways via local access streets. A number of minor residential access roadways are oriented in the north-south direction, most of which intersect with an internal circular roadway comprised of 11th Avenue SW, SW 97th Street, and 5th Avenue SW. Near the southern edge of the project site, the street system is more traditional, with a standard grid pattern. Within the site, the current street network functions to slow traffic and discourage cut-through traffic in this predominately residential neighborhood. The exception to this function is seen on 8th Avenue SW, SW Roxbury Street, SW 100th Street, SW 102nd Street, and 4th Avenue SW, all of which serve higher volumes of traffic than the local neighborhood roadways.



Source: The Transpo Group

Huckell/Weinman Associates, Inc. HWA

Greenbridge

Figure 3.15-1

Existing Study Area Characteristics

Signalized study intersections are controlled with either fully actuated or pre-timed traffic signals. Individual characteristics of the adjacent study roadways, including classification and posted speed limits are illustrated in Figure 3.15-1.

Traffic Volumes

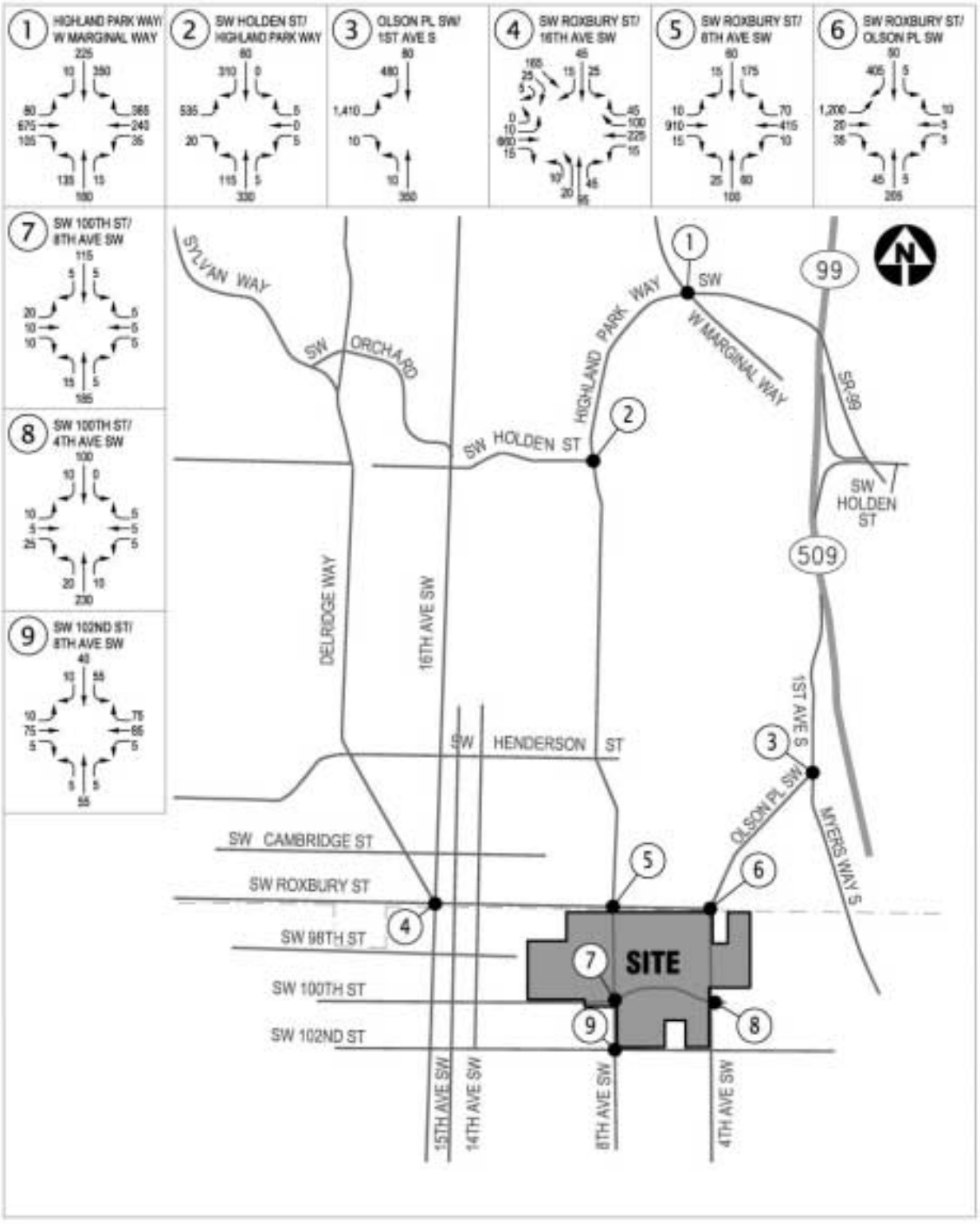
Existing traffic volume data was compiled for the study area to characterize traffic conditions during the weekday AM and PM peak hours. Peak hour traffic counts were conducted on November 21st, 2002 at most study intersections. Traffic counts at Highland Park Way SW/SW Holden Street were collected on December 5th, 2001 while counts at Marginal Way SW/Highland Park Way during the PM peak hour were collected December 6th, 2001. Counts collected in 2001 were increased by a 1.0-percent annual growth rate to estimate 2002 existing traffic volumes. One percent annual growth is consistent with historic peak hour traffic growth in the project vicinity. **Figures 3.15-2** and **3.15-3** summarize existing weekday AM and PM peak hour traffic volumes at study intersections, respectively.

Traffic Operations

The operational characteristics of an intersection are determined by calculating the intersection's level of service (LOS). The intersection as a whole and its individual turning movements can be described with a range of levels of service (LOS A to F), with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. At signalized and all-way, stop-controlled, unsignalized intersections, LOS is measured in terms of average total delay per vehicle and is typically reported for the intersection as a whole. At two-way, stop-controlled, unsignalized intersections, LOS is measured in terms of the average vehicle delay of an individual movement and typically reports for the worst movement.

LOS methodology contained in the *2000 Highway Capacity Manual* (*HCM)* was applied to the study intersections to estimate existing peak hour levels of service. The 2000 methodology is the most up-to-date methodology available for calculating intersection LOS. **Table 3.15-1** illustrates existing study intersection levels of service, average vehicle delays, and each intersection's volume-to-capacity (v/c) ratio for both AM and PM peak hour conditions.

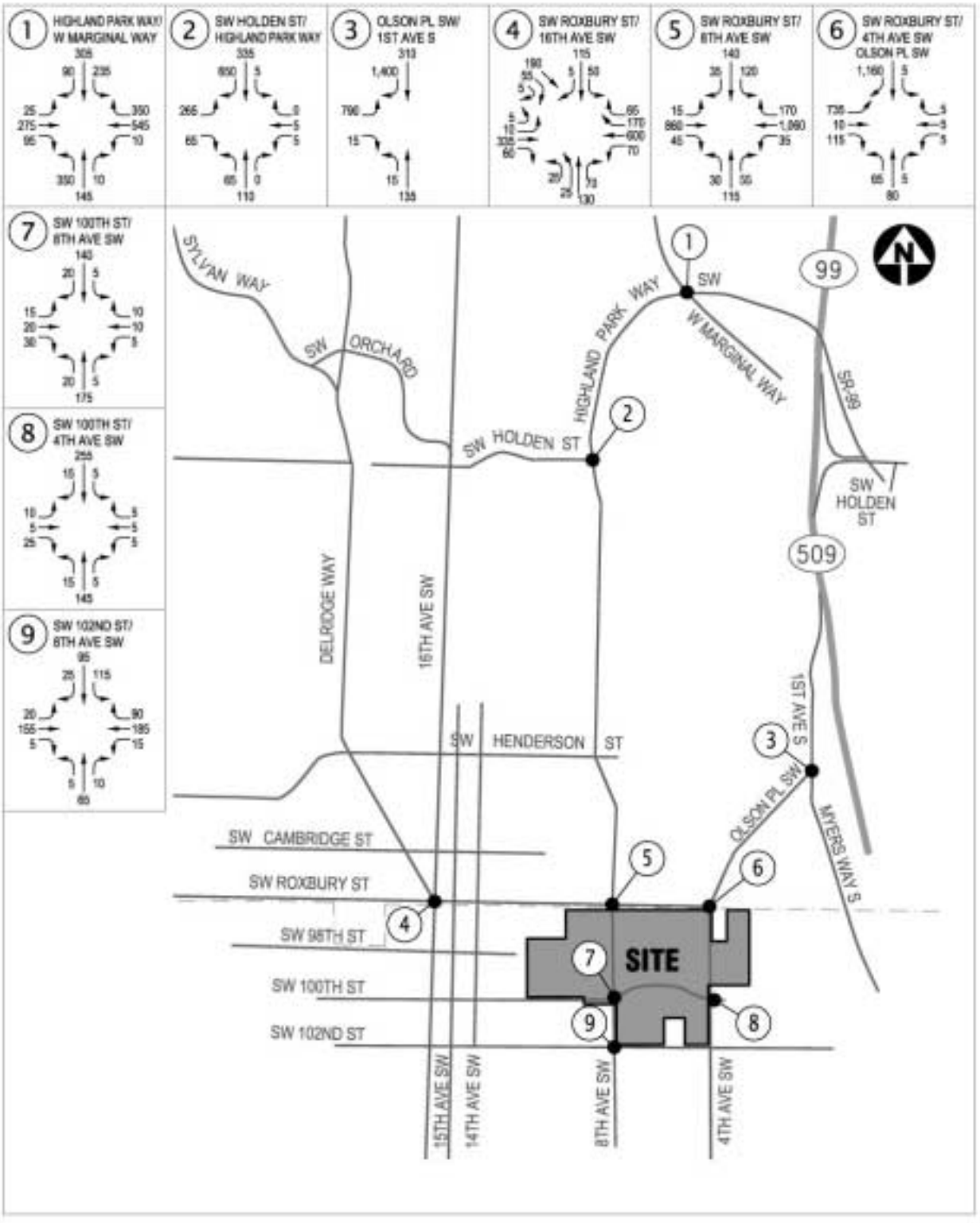
The results in Table 3.15-1 show that all but one of the study intersections operates at LOS D or better during the AM and PM peak hours. The eastbound left turn at the unsignalized SW Holden Street/Highland Park Way SW intersection tends to experience high delays during the AM peak hour and operates at LOS F. This intersection is stop-controlled on SW Holden Street, while Highland Park Way SW operates under free-flow conditions. Raised c-curb on Highland Park Way SW effectively separates eastbound left-turning traffic and northbound through traffic. However, eastbound left turns, after completing their turn onto Highland Park Way SW, have their own travel lane in which to proceed north due to Highland Park Way SW widening from one to two northbound lanes at this intersection.



Source: The Transpo Group

Figure 3.15-2

Existing AM Peak Hour Traffic Volumes



Source: The Transpo Group

Huckell/Weinman Associates, Inc. HWA

Greenbridge

Figure 3.15-3

Existing PM Peak Hour Traffic Volumes

King County's LOS standard is LOS E or better at both signalized and unsignalized intersections. All King County study intersections currently operate at LOS E or better and meet this minimum standard. SW Holden Street/Highland Park Way SW does not meet this standard but is located in the City of Seattle. Intersection levels of service reported in Table 3.15-1 provide an observable frame of reference for reviewing and understanding forecast conditions, and for disclosing potential transportation impacts

Table 3.15-1

EXISTING AM AND PM PEAK HOUR LOS SUMMARY

Signalized Intersections[1]	**AM Peak Hour**			**PM Peak Hour**		
	LOS[2]	**Del**[3]	**V/C**[4]	**LOS**	**Del**	**V/C**
16th Avenue SW/SW Roxbury Street	C	21.9	0.50	C	24.1	0.67
8th Avenue SW/SW Roxbury Street	C	23.7	0.61	B	16.8	0.68
Olson Place SW/SW Roxbury Street	B	14.9	0.66	B	11.5	0.42
1st Avenue S/Olson Place SW	A	9.9	0.61	D	40.8	1.00
Highland Park Way SW/W Marginal Way SW	C	31.8	0.69	C	32.3	0.77
Unsignalized Intersections	**AM Peak Hour**			**PM Peak Hour**		
	LOS	**Del**[5]	**WM**[6]	**LOS**	**Del**	**WM**
8th Avenue SW/SW 100th Street	B	11.3	EB App	B	11.5	WB App
4th Avenue SW/SW 100th Street	B	11.6	WB App	B	11.7	WB App
8th Avenue SW/SW 102nd Street[7]	A	8.4	--	B	10.9	--
Highland Park Way SW/SW Holden Street	F	56.1	EB Left	D	30.1	EB Left

Notes:
1. LOS, delays, and v/c ratios at signalized intersections reflect the operation of the intersection as a whole.
2. LOS = Level of Service (A-F)
3. Del = Average control delay measured in seconds per vehicle
4. V/C = Critical volume-to-capacity ratio
5. Delay for unsignalized intersections reflects the delay for the worst movement.
6. WM = Worst Movement. App = Approach
7. All-way stop controlled intersection- delay represents operation of the intersection as a whole

Source: Transpo Group, 2003

Study intersections on SW Roxbury Street and north are in the City of Seattle. The City's Comprehensive Plan does not define a level of service standard for individual intersections. Instead, operational standards focus on characteristics of the overall transportation system over which the City has some influence and control.[1] As with the existing conditions LOS results at King County study intersections, intersection levels of service reported in Table 3.15-1 provide an observable frame of reference for reviewing and understanding forecast conditions, and for disclosing potential transportation impacts.

[1] Specifically, the City defines arterial levels of service to be the v/c ratio as designated screenlines, each of which encompasses one or more arterial routes. The operational standard measures the PM peak hour directional traffic volumes on the arterials crossing each screenline to calculate the screenlevel of service. To evaluate the performance of the arterial system, the calculated level of service for each screenline is compared with the level of service standard for a particular screenline, as defined by the City. The level of service standard is typically a v/c ratio of 1.0 to 1.2 for each screenline. Seattle does not require a concurrency analysis of projects located outside of City limits.

Transit

King County Metro and Sound Transit primarily provide transit service in the study area. The following sub-sections describe existing transit coverage, service levels, stops, and access within the study area.

Transit Coverage

Figure 3.15-4 illustrates the existing King County Metro and Sound Transit bus routes. These routes provide connections between the downtown Seattle area and the regions surrounding White Center, Southcenter, and other areas within the City of Seattle. Additional transfer and transit opportunities exist via the Olson Place & Myers Way Park-and-Ride lot, which is a 562-stall parking lot located northeast of the site. Several of the transit routes that frequent the White Center area also make scheduled stops at this lot.

Transit Service Levels

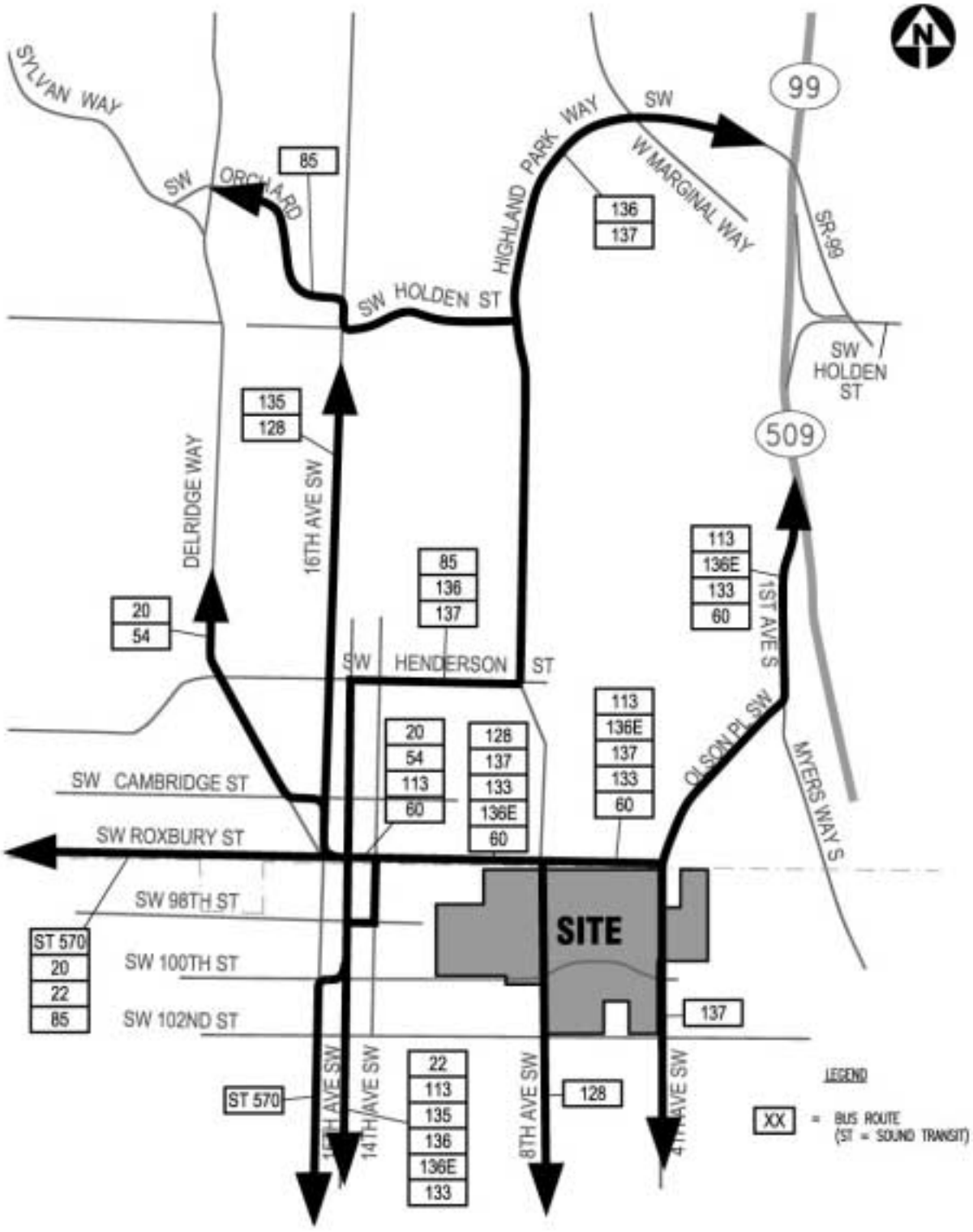
Table 3.15-2 summarizes the existing transit service in the project's vicinity. This table includes information on the service routes, times, frequencies, and areas served.

Table 3.15-2
EXISTING TRANSIT SERVICE

	Service Times and Frequencies (min)				
Route	Peak Hour	Midday/Early Evening	Evening	Weekend	Major Areas Served
20	5-30	30	30	30	Downtown/Shorewood
22	30	30	30	30	Downtown/White Center
54	30	30	30	30	Downtown/White Center
85	-	-	-	-	Downtown/North Seattle/White Center
113	30	-	-	-	Downtown/White Center
128	30	30	30	60	West Seattle/White Center/Tukwila
133	30	-	-	-	University District/White Center/Burien
135	30	30	30	30	Downtown/White Center/Burien
136	30-60	60	60	60	Downtown/White Center/Burien
136E	15-30	-	-	-	Downtown/White Center/Burien
137	30-60	60	60	60	Downtown/White Center/Burien
ST 570	30	60	-	-	Downtown/White Center/SeaTac

Source: Transpo Group, 2003

As illustrated in Table 3.15-2, the majority of existing routes operate during the weekday peaks, midday, and evening periods, as well as on weekends. Route 85, however, is a Night Owl service line, running between the hours of 2 and 4 a.m. During morning and afternoon peak periods, existing routes operate with headways ranging from 5 to 60 minutes. Service headways range from 30 to 60 minutes during the weekday off-peak periods and on weekends.



Source: The Transpo Group

Huckell/Weinman Associates, Inc. HWA

Greenbridge

Figure 3.15-4

Existing Transit Routes

Transit Stops

The White Center transit transfer point is located west of the site on 15th Avenue SW, just south of SW Roxbury Street. This transfer point operates as a key stop for many of the bus routes in the White Center area, serving as a local hub of transit activity. In addition, a number of transit stops are located within the general boundaries of the site, as well as within walking distance to/from the site. Several routes have transit stops along both SW Roxbury Street and 15th Avenue SW, while Route 128 operates within the project site along 8th Avenue SW, with stops located periodically along the roadway. Route 137 has several stops along the eastern edge of the site, on 4th Avenue SW. In general, the White Center area surrounding the site is well served by transit, providing a range of local and regional service within a reasonable walking distance to and from the site.

Non-Motorized Facilities

Walking and bicycling are important elements of the transportation system, especially as each relates to travel mode choice and the effort to reduce vehicular travel. The following sub-sections describe the existing pedestrian and bicycle facilities within the site's vicinity.

Pedestrian Facilities

Sidewalks exist on most principal arterials, minor arterials, and local access streets within the study area. In some places, sidewalks may exist on only one side of the roadway. The sidewalks in the area range in width and condition. In addition, most signalized study intersections include crosswalks, pedestrian push buttons, and signal protected crossings to facilitate pedestrian circulation.

Bicycle Facilities

There are no designated (striped) on-street bicycle lanes within the study area. The current *King County Bicycling Guide Map* illustrates 8th Avenue SW-Highland Park Way SW, north of SW Roxbury Street; and 4th Avenue SW, south of SW Roxbury Street, as roadways commonly used by bicyclists due to moderate to heavy traffic volumes with a wide curb lane or paved shoulder. Also, the *King County Bicycling Guide Map* illustrates 16th Avenue SW, south of SW Roxbury Street, as a roadway for bicyclists to use with caution, as it has heavy traffic volumes without a wide curb lane or shoulder. With study area streets lacking on-street bicycle lanes, bicyclists typically ride within the existing travel lanes or on paved shoulders.

Traffic Safety

Records of reported vehicle collisions were reviewed within the study area to document existing traffic safety issues. The most recent summary of collision data from both King County and the City of Seattle was obtained for the five-year period between January 1, 1997 and December 31, 2001. A historical review of the frequency of collisions was conducted at all study intersections, as well as adjacent roadway segments. A summary of the total and average annual number of collisions at each study intersection is shown in **Table 3.15-3**.

Table 3.15-3
COLLISION SUMMARY: 1997-2001

Intersection	Signalized?	1997	1998	1999	2000	2001	Total	Avg/Yr	MEV/MVM[2]
SW Roxbury Street/ 16th Avenue SW	Yes	1	6	4	1	4	16	3.2	0.44
8th Avenue SW/ SW Roxbury Street	Yes	8	8	6	5	9	36	7.2	0.74
Olson Place SW/ SW Roxbury Street	Yes	3	3	2	0	3	11	2.2	0.26
8th Avenue SW/ SW 100th Street	No	0	0	2	0	1	3	0.6	0.36
4th Avenue SW/ SW 100th Street	Yes	0	1	1	0	0	2	0.4	0.22
8th Avenue SW/ SW 102nd Street	No	0	0	0	0	1	1	0.2	0.07
1st Avenue S/Olson Place SW	Yes	0	3	4	4	6	17	3.4	0.35
Highland Park Way SW/ SW Holden Street	No	1	0	3	2	0	6	1.2	0.22
Highland Park Way SW/ W Marginal Way SW	Yes	3	1	2	1	2	9	1.8	0.20
Roadway Segment[1]		**1997**	**1998**	**1999**	**2000**	**2001**	**Total**	**Avg/Yr**	**MEV/MVM**
16th Avenue SW: between SW Roxbury Street and SW 102nd Street	NA	10	12	12	10	23	67	13.4	17.85
SW 100th Street: between 16th Avenue SW and 4th Avenue SW	NA	1	2	1	2	4	10	2.0	9.08
4th Avenue SW: between SW 102ndh Street and SW Roxbury Street	NA	11	8	6	8	8	41	7.8	13.29
SW 102nd Street: between 16th Avenue SW and 4th Avenue SW	NA	17	10	13	8	9	57	11.4	9.37
SW Roxbury Street: between Delridge Way SW and 4th Avenue SW	NA	20	39	27	17	17	120	24.0	4.30

1. Includes collisions at non-study intersections within each noted roadway segment
Source: Transpo Group, 2003
2. MEV=Collisions per million entering vehicles; MVM=Collisions per million vehicle miles traveled

The study intersection with the highest average number of collisions per year over the noted time period was found to be 8th Avenue SW/SW Roxbury Street, which averaged 7.2 collisions per year. The roadway segment with the highest average number of collisions per year was on SW Roxbury Street, between Delridge Way SW and 4th Avenue SW, with an average of 24 collisions per year. Fewer accidents were reported on this section of SW Roxbury Street in recent years, with a declining trend since 1998. It should be noted that the collisions reported along these roadway segments include those collisions that occurred at non-study intersections.

In addition, rates for the number of accidents per million entering vehicles (MEV) were calculated at study intersections. Typically, an intersection with an MEV rate of 1.0 or higher is considered to have a safety deficiency. As is shown in Table 3.15-3, none of the study

intersections have an MEV rate over this threshold, with the highest being 0.74 at 8th Ave SW/SW Roxbury Street.

Collision rates per million vehicle miles (MVM) traveled were calculated for the identified roadway segments. Typically, a corridor with an MVM rate of 10.0 or higher is considered to have some degree of safety deficiency. As is shown in Table 3.15-3, two of the identified roadway segments exceed this general 10.0 MVM rate threshold.

Both the 16th Avenue SW roadway segment (between SW Roxbury Street and SW 102nd Street) and the 4th Avenue SW (between SW 102nd Street and SW Roxbury Street) segment both exceed this threshold. While neither segment's data includes those collisions at study intersections along each respective corridor, they do include a substantial number of non-study intersection collisions. For instance, on the 16th Avenue SW segment, 55-percent of the collisions were at intersections, while on the 4th Avenue SW segment, 33-percent of the collisions occurred directly at 4th Avenue SW/SW 102nd Street. The signalization of 4th Avenue SW/SW 102nd Street has been identified by King County as a high priority in its 2001-2020 Transportation Needs Report.

Of the 16th Avenue SW roadway segment collisions, 24-percent were turn-related, 16-percent were rear-end collisions, and 13-percent involved moving vehicles striking parked cars. Front-in angle on-street parking is present along 16th Avenue SW in this area, possibly contributing to a proportion of these collisions. On the 4th Avenue SW segment, the predominant collision type, representing 33-percent of the total collisions, involved vehicles striking either parked cars or fixed objects.

King County identifies High Accident Locations (HALs) and High Accident Roadway (HARs) throughout the county. Three HALs are located in the immediate vicinity of the project site: SW 100th Street/White Center Cut-off, 17th Avenue SW/SW 98th Street, and 8th Avenue SW/SW 108th Street.

Five HARs are also located in the project vicinity. They include:

- 16th Avenue SW/ SW 107th Street-640 feet South of SE 110th Street
- 16th Avenue SW/ SW Roxbury Street- 500 feet South of SW 98th Street
- 16th Avenue SW/ SW 112th Street- 550 feet South of SW 114th Street
- SW 116th Street/ 100 West of 8th Avenue SW- 500 feet West of 10th Avenue SW
- 15th Avenue SW/ SW Roxbury Street- 300 feet South of SW 98th Street

The 16th Avenue SW/SW Roxbury Street area HAR (County HAR #9) designation is consistent with the MVM rates and corresponding collision data noted earlier. The county has recommended a countermeasure for this roadway section along with some of the other HARs in the area; these improvements are detailed as appropriate in the project impacts section.

Washington State Department of Transportation identifies safety deficiencies on state roadways by designating high accident locations (HALs) and high accident corridors (HACs). One HAL and one HAC are located in the immediate vicinity of the proposed project. Further clarification of the HAL, identified as the SB off ramp from SR 509 to Cloverdale Street, is currently being sought.

The HAC near the project vicinity is designated by WSDOT in the area is on SR 509, from just North of S 112th Street to North of the Meyers Way Southbound Off-ramp. Further details regarding the accident record for this location is also currently being sought.

No improvements appear to have been identified by WSDOT for either location.

The City of Seattle has identified criteria for classifying high accident locations (HALs) as those intersections that experience above average accident rates. Intersections with this designation would be targeted for future safety improvements in an effort to improve traffic safety and reduce the number of reported collisions. Seattle Department of Transportation classifies a signalized intersection as a HAL if it experienced, on average, ten or more collisions per year over 4 or more years. An unsignalized intersection is classified as a HAL if it experienced, on average, five or more collisions per year. King County generally follows these same standards. Based on the collision data provided by both the City of Seattle and King County, none of the study intersections would be classified as a HAL

Sight distances were measured at the intersection of 8th Avenue SW/SW Roxbury Street, the study intersection with the highest number of average collisions per year. The vertical curvature of SW Roxbury Street west of 8th Avenue SW obstructs both entering and stopping sight distance at this intersection. This obstruction has likely contributed to a portion of the accidents reported in recent years. Three different sight distance measurements were identified as potentially troublesome at the intersection, and were measured according to American Association of State Highways and Transportation Officials (AASHTO) and/or Washington State Department of Transportation (WSDOT) sight distance measurement specifications. For this analysis, a 45 mph design speed was assumed.

Stopping sight distance for an eastbound traveling vehicle was measured to determine a driver's ability to see an object, such as a vehicle stopped at the signal, in the roadway at the 8th Avenue SW/SW Roxbury Street intersection; The most limited measured stopping sight distance for an eastbound driver cresting the hill was approximately 290 feet. This is substandard by 80 feet.

Entering sight distance was measured for a vehicle at 8th Avenue SW/SW Roxbury Street making a right turn on red. The entering sight distance for the northbound right turn was measured to be approximately 345 feet. This is substandard by approximately 85 feet.

For westbound drivers wishing to turn southbound (left) at this intersection, sight distance to approaching vehicles is limited to 410 feet. This is substandard by about 45 feet.

Parking

Parking for the residents is provided by a combination of driveways and carports at individual units and on-street parking along most of the internal roadways. Parking for non-residential uses, including the Community Center, Maintenance Center and other support services, is provided in off-street surface parking lots. This is supplemented with on-street parking along 8th Avenue SW. Along the non-internal roadways, parking restrictions vary. On SW Roxbury Street, no parking is allowed, while on 8th Avenue SW and 4th Avenue SW parallel parking is permitted on both sides of the street.

In order to determine the parking demand for the current residents, a parking utilization count was performed at 5:30 AM in October 2003. The results of that count indicated that current car ownership, site-wide, is 1.37 vehicles per occupied unit. A review of an aerial photo that was taken mid-week, mid-day in 2001 indicated that the day-time parking utilization equated to 0.63 per occupied unit, based on the number of units that were occupied at the time.